

Appendix B

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APPENDIX B-1: Summary Tables for Fire and Fuel Model Analysis

The following tables are used to illustrate potential fire behavior and effects when fire burns under 90th percentile fire weather conditions (severe). Stands were modeled using the Forest Vegetation Simulation (FVS) (Revised 2003) Fire and Fuels Extension (FFE) computer modeling software. (All numeric values have been rounded to the nearest whole number, with the exception of some values of average FHR.)

Table B 1. Existing Conditions			
Parameter	2004	2014	2024
<i>Potential Fire Behavior</i>			
Fuel Model ^A	9	9	9
Fire Hazard Rating ^B	3	3	3
Flame Length (feet)	24	26	26
Fire Type ^C	S	P,A,S	P
Torching Index ^D (mph)	8	5	5
Crowning Index ^D (mph)	41	28	28
<i>Fuels and Fire Effects</i>			
Surface Fuels ^E (tons per acre)	10	12	14
Standing Fuels ^E (tons per acre)	49	59	69
Total Fuels (tons per acre)	59	72	83
Mortality (Percent)	94	92	92
Trees per Acre	1,807	1,804	1,692

Table B 2. CT-WUI (Commercial Thinning in Wildland-Urban Interface)			
Parameter	2004	2014	2024
<i>Potential Fire Behavior</i>			
Fuel Model ^A	1,2	9	9
Fire Hazard Rating ^B	3	2	1
Flame Length (feet)	10	8	7
Fire Type ^C	P	S,P	S
Torching Index ^D (mph)	14	31	38
Crowning Index ^D (mph)	98	88	73
<i>Fuels and Fire Effects</i>			
Surface Fuels ^E (tons per acre)	7	6	8
Standing Fuels ^E (tons per acre)	20	19	28
Total Fuels (tons per acre)	27	26	35
Mortality (Percent)	76	50	37
Trees per Acre	97	86	97

Table B 3. NC-WUI (Non-commercial Thinning in Wildland-Urban Interface)			
Parameter	2004	2014	2024
<i>Potential Fire Behavior</i>			
Fuel Model ^A	2,11	9	9
Fire Hazard Rating ^B	2	2	1
Flame Length (feet)	14	6	6
Fire Type ^C	P	S,P	S
Torching Index ^D (mph)	15	39	45
Crowning Index ^D (mph)	36	40	40
<i>Fuels and Fire Effects</i>			
Surface Fuels ^E (tons per acre)	9	10	10
Standing Fuels ^E (tons per acre)	42	49	58
Total Fuels (tons per acre)	51	59	68
Mortality (Percent)	83	38	27
Trees per Acre	175	174	171

Table B 4. CT-Non-WUI (Commercial Thin)			
Parameter	2004	2014	2024
<i>Potential Fire Behavior</i>			
Fuel Model ^A	9	9	9
Fire Hazard Rating ^B	2	1	1
Flame Length (feet)	7	8	7
Fire Type ^C	S	S,P	S
Torching Index ^D (mph)	39	33	39
Crowning Index ^D (mph)	101	83	78
<i>Fuels and Fire Effects</i>			
Surface Fuels ^E (tons per acre)	10	9	9
Standing Fuels ^E (tons per acre)	17	20	24
Total Fuels (tons per acre)	27	29	33
Mortality (Percent)	37	33	39
Trees per Acre	96	92	92

Table B 5. NC-Non-WUI (Non-commercial Thin)			
Parameter	2004	2014	2024
<i>Potential Fire Behavior</i>			
Fuel Model ^A	9	9	9
Fire Hazard Rating ^B	3	2	1
Flame Length (feet)	10	8	7
Fire Type ^C	P	P,S	S,P
Torching Index ^D (mph)	17	25	27
Crowning Index ^D (mph)	44	40	39
<i>Fuels and Fire Effects</i>			
Surface Fuels ^E (tons per acre)	9	8	9
Standing Fuels ^E (tons per acre)	31	38	44
Total Fuels (tons per acre)	39	47	53
Mortality (Percent)	66	63	57
Trees per Acre	313	310	302

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Table B 6. PCT (Pre-commercial Thin)			
Parameter	2004	2014	2024
<i>Potential Fire Behavior</i>			
Fuel Model ^A	6	6	6
Fire Hazard Rating ^B	3	3	3
Flame Length (feet)	17	18	16
Fire Type ^C	P	P	P
Torching Index ^D (mph)	4	5	6
Crowning Index ^D (mph)	40	35	32
<i>Fuels and Fire Effects</i>			
Surface Fuels ^E (tons per acre)	13	12	12
Standing Fuels ^E (tons per acre)	34	44	55
Total Fuels (tons per acre)	47	56	66
Mortality (Percent)	94	93	81
Trees per Acre	366	359	352

Table B 7. CT1 (Commercial Thin Modified for Wildlife habitat and Vegetative Diversity)			
Parameter	2004	2014	2024
<i>Potential Fire Behavior</i>			
Fuel Model ^A	2,11	9	9
Fire Hazard Rating ^B	2	1.5	1
Flame Length (feet)	7	7	6
Fire Type ^C	S,P	S	S
Torching Index ^D (mph)	21	42	46
Crowning Index ^D (mph)	76	63	60
<i>Fuels and Fire Effects</i>			
Surface Fuels ^E (tons per acre)	10	10	10
Standing Fuels ^E (tons per acre)	28	32	38
Total Fuels (tons per acre)	38	42	48
Mortality (Percent)	48	30	23
Trees per Acre	123	122	121

Table B 8. CT2 (Commercial Thin Modified for Wildlife habitat and Vegetative Diversity)			
Parameter	2004	2014	2024
<i>Potential Fire Behavior</i>			
Fuel Model ^A	11,6	9	9
Fire Hazard Rating ^B	2	1.5	1
Flame Length (feet)	5	5	5
Fire Type ^C	S	S	S
Torching Index ^D (mph)	39	58	63
Crowning Index ^D (mph)	46	41	40
<i>Fuels and Fire Effects</i>			
Surface Fuels ^E (tons per acre)	12	13	13
Standing Fuels ^E (tons per acre)	53	63	73
Total Fuels (tons per acre)	65	75	86
Mortality (Percent)	30	20	16
Trees per Acre	187	184	181

Table B 9. NC1 (Non-commercial Thin Modified for Wildlife habitat and Vegetative Diversity)			
Parameter	2004	2014	2024
<i>Potential Fire Behavior</i>			
Fuel Model ^A	6,2	9	9
Fire Hazard Rating ^B	2	2	1.5
Flame Length (feet)	16	9	8
Fire Type ^C	S	S,P	S,P
Torching Index ^D (mph)	11	28	34
Crowning Index ^D (mph)	37	37	36
<i>Fuels and Fire Effects</i>			
Surface Fuels ^E (tons per acre)	9	9	8
Standing Fuels ^E (tons per acre)	43	51	61
Total Fuels (tons per acre)	51	61	70
Mortality (Percent)	79	61	47
Trees per Acre	418	411	404

Notes:

^ADominant fuel model derived from FVS calculations using Anderson (1982): 1 = Short grass; 2 = Timber (grass and understory); 6 = Dormant brush, hardwood slash; 9 = Hardwood litter; 11 = Light logging slash.

^BFire Hazard Rating: 1 = Low; 2 = Moderate; 3 = High; 4 = High High; 5 = Very High; 6 = Extreme.

^CFire Type: **A**ctive = a fire that once it has moved into the canopy can be sustained in the canopy; **P**assive = a crown fire that starts at the surface, but moves into the canopy torching individual or groups of trees; **S**urface = fire burns in the surface fuel layer, excluding the crowns of trees.

^D**Torching index** refers to the 20-foot wind speed (in miles per hour) at which a surface fire is expected to ignite the crown layer, while **crowning index** is the 20-foot wind speed (in miles per hour) needed to support an active or running crown fire. The lower the wind speed represented by these indices, the more susceptible that the stand is to torching or crowning, respectively.

^EFuel Load: Surface fuels = Sum of surface fuels (both live and dead)
 Standing fuels = Sum of standing wood (both live and dead)

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APPENDIX B-2: LIST OF SYSTEM ROADS.

Table B 10. SYSTEM ROAD MILES BY MAINTENANCE TYPE AND ROUTE NUMBER									
LAND OWNERSHIP									
Route Number	Forest Service				Forest Service Total	Other Ownership		Other Ownership Total	Grand Total
	Exist. sys rd, Proposed tmp	Maintenance Only	Recondition	Reconstruction		Maintenance Only	State Roads		
3071		1.573	0.689		2.262				2.262
30711		0.121			0.121				0.121
30712		1.111			1.111				1.111
3101		4.64			4.64	0.554		0.554	5.194
31011		0.769			0.769				0.769
31012		0.655			0.655				0.655
31013		0.164			0.164				0.164
31014		0.07			0.07				0.07
31015		1.06			1.06				1.06
3101A		0.222			0.222	0.454		0.454	0.676
3101B		0.249	0.901		1.15	0.415		0.415	1.565
3101C	0.543	1.618			2.161				2.161
3101D		0.372			0.372	0.683	1.159	1.842	2.214
3101D1							1.123	1.123	1.123
3101D1A							0.98	0.98	0.98
3101D1B							0.343	0.343	0.343
3101D2							0.224	0.224	0.224
3101D3							0.546	0.546	0.546
3101D3A							0.311	0.311	0.311
3101D3A1							0.087	0.087	0.087
3101E		0.7	1.154		1.854				1.854
3101E1	0.269		0.83		1.099				1.099
3101E1A		0.29			0.29				0.29
3101E2		0.201			0.201				0.201
3101E3		0.054			0.054				0.054
3101E4		0.752			0.752				0.752
3101F	0.49	0.175			0.665				0.665
3101W		0.799			0.799				0.799
31022		0.226			0.226				0.226
3102A		0.68	0.713	0.546	1.939				1.939
3102A1		0.165			0.165				0.165
3102A2		0.139			0.139				0.139
3102A3		0.405			0.405				0.405
3104		5.368	0.119	1.621	7.108				7.108
31041		0.51			0.51				0.51
310410		0.154			0.154				0.154
31042		0.261			0.261				0.261
31043		0.203			0.203				0.203
31044		0.242			0.242				0.242

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Table B 10. SYSTEM ROAD MILES BY MAINTENANCE TYPE AND ROUTE NUMBER

LAND OWNERSHIP									
Route Number	Forest Service				Forest Service Total	Other Ownership		Other Ownership Total	Grand Total
	Exist. sys rd, Proposed tmp	Maintenance Only	Recondition	Reconstruction		Maintenance Only	State Roads		
31045		0.183	0.231		0.414				0.414
31046	0.38	0.52			0.9				0.9
31047	1.338	0.561			1.899				1.899
31048		1.005			1.005				1.005
31049			0.871		0.871				0.871
3104A		0.098			0.098				0.098
3104B		0.052			0.052				0.052
3104C		0.048			0.048				0.048
3105		0.257	0.205		0.462				0.462
3106		2.414			2.414				2.414
31061		0.194			0.194				0.194
3107		1.687			1.687				1.687
31071		0.547			0.547				0.547
31072		1.397			1.397				1.397
3108		0.381	0.716		1.097				1.097
3108A		0.164			0.164				0.164
3108B		0.215			0.215				0.215
3108C		0.165			0.165				0.165
3109	0.185	2.015	0.292		2.492				2.492
31091		0.146			0.146				0.146
31092			0.296		0.296				0.296
31093		0.109			0.109				0.109
31094		0.079			0.079				0.079
31095	0.347	0.558			0.905				0.905
31096		0.226			0.226				0.226
3401		0.776			0.776				0.776
3401A		0.109			0.109				0.109
3401B		0.631			0.631				0.631
3811		0.296		1.842	2.138				2.138
38111		1.456	1.055		2.511				2.511
38112		0.415			0.415				0.415
38113		0.708			0.708				0.708
38114	0.033	0.154			0.187				0.187
3811J		0.16	0.859		1.019				1.019
3812		2.406			2.406				2.406
38121		0.154			0.154				0.154
3812A		1.105			1.105				1.105
3812A1		1.775			1.775				1.775
3813		3.247		1.067	4.314				4.314
38131		0.382			0.382				0.382
38131A		0.855			0.855				0.855
38132		0.336			0.336				0.336
38133				0.217	0.217				0.217
38134		0.084			0.084				0.084

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Table B 10. SYSTEM ROAD MILES BY MAINTENANCE TYPE AND ROUTE NUMBER

LAND OWNERSHIP									
Route Number	Forest Service				Forest Service Total	Other Ownership		Other Ownership Total	Grand Total
	Exist. sys rd, Proposed tmp	Maintenance Only	Recondition	Reconstruction		Maintenance Only	State Roads		
3813A		0.187			0.187				0.187
3813B		1.824	1.612		3.436				3.436
3813B1		0.377			0.377				0.377
3813B2			0.337		0.337				0.337
3813B2A		0.236			0.236				0.236
3813B3		0.072			0.072				0.072
3813C		0.303			0.303				0.303
3813D		0.214			0.214				0.214
3814		0.148	1.117	0.572	1.837				1.837
3814A		0.323			0.323				0.323
3814B		0.648			0.648				0.648
3814D		1.457			1.457				1.457
38201		0.107			0.107				0.107
3CNTY_PD		0.905			0.905				0.905
3HWY323		1.775			1.775				1.775
(blank)	0.588	0.266			0.854				0.854
Grand Total	4.173	60.86	11.997	5.865	82.895	2.106	4.773	6.879	89.774

APPENDIX B-3: CUMULATIVE IMPACTS ACTIVITIES LIST

This section will summarize the analysis area and the temporal scale (time) considered for the cumulative effects analysis. In addition, a summary list of cumulative effects activities is presented. *Each resource section in this chapter has disclosed the specific cumulative effects for that particular resource area. Refer to those sections for a specific discussion of cumulative effects.*

Scope of the Cumulative Effects Area

The area chosen for the cumulative effects area is the entire Ekalaka Hills Land Unit managed by the Custer NF. The reason for this area being selected is that the Sioux Ranger District manages land units that are “islands” of forested landscape in the larger prairie-grassland ecosystem. Many miles separate these forested islands from each other, and the effects of management tend to be restricted to each land unit. Surrounding lands are primarily private lands managed for livestock use, with a minor amount of lands managed by the Bureau of Land Management in scattered parcels adjacent to the Ekalaka Hills Unit. The temporal scale (time limits for past activities) selected for this project is from 1992 to the present and was selected due to the most recent timber sales in the Ekalaka Hills land unit began in 1992.

Past, Present and Reasonably Foreseeable Future Actions

The following list of cumulative effects activities is considered for this project. A maps showing these activities in relationship to the Ekalaka Hazardous Fuel project area are also found in [Appendix A-Map 3f](#). The following Table B 11 summarizes those past, ongoing and foreseeable future activities with a description of the activity and the acres affected.

Table B 11: List of Cumulative Effects Activities

Project Name	Activity Type	Acres	Date
Past Activities			
OG Breaks Timber Sale	Timber harvest and thinning	634	1992
Ozona Breaks Timber Sale	Timber harvest and thinning	321	1993
Eka Breaks Timber Sale	Timber harvest and thinning	434	1994
Smokey Breaks Timber Sale	Timber harvest and thinning	563	1996
Laka Breaks Timber Sale	Timber harvest and thinning	732	2002-present
Aspen Timber Sale (State of MT)	Timber harvest and thinning	357	2002-2003
Salvage and thinning on private lands		UK	UK
Ongoing Activities			
Laka Breaks Timber Sale	Timber harvest and thinning	732	2002-present
Livestock Grazing	8 allotments with a total of 645 head	20,000	Ongoing each year
Noxious weed control	Spraying chemicals	UK	Ongoing each year
Recreational Activities	Camping, hunting, firewood gathering	NA	Ongoing each year
Camp Needmore SUP	Authorize Special Use Permit	9.5 acres	Ongoing each year
Foreseeable Future Activities			
BLM Timber Sales or Rx fire	Timber harvest, thinning and Rx fire for fuels reduction.	UK	UK